A Banner Year for CRADAs

Lab has 11 agreements in various stages of completion

While most DOE laboratories have been scaling back their participation in the agency's Cooperative Research and Development Agreement, or CRADA, program, this year the Ames Laboratory is signing a record number of CRADAs.

Eleven CRADAs are in various stages of development at the Laboratory. "Normally we do from 1-3 CRADAs per year," says Deb Covey, manager of Industrial Outreach and Technology Administration. "So this has been a busy year for us." All 11 of the recent CRADAs are the result of the Lab's new Biorenewables Resources Consortium, for which it received $2 million in federal funding in 2002. The funding was announced by U.S. Rep. Tom Latham in January.

As the name suggests, cooperation is a key element of CRADAs. Through the agreements, DOE labs develop partnering relationships with corporations and organizations that allow DOE research to be brought to market in the form of products or processes. All CRADAs must include some type of contribution from the Lab's partner in the project. In the case of the 11 CRADAs, the contribution was at least 20 percent in matching funds from the partners. The Lab deals with two types of CRADAs. They are "funds-in" and "in-kind" CRADAs. Funds-in CRADAs require the partner to contribute cash to help fund the research effort involved in the CRADA. With in-kind CRADAs, the partner's contribution can be in the form of expertise and worker salary rather than cash. In all but one of the 11 CRADAs being negotiated with the Lab, the partner contribution is of the latter type. "Since Iowa State University is the partner in these CRADAs," says Covey, "the expertise/salary contribution is a natural fit."

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Research funded by the 11 CRADAs easily fits with the BRC's mission, which is to develop technologies that lessen our nation's dependence on fossil resources and petrochemicals as energy sources by developing agricultural alternatives, such as plant matter, or biomass, to create products and energy.

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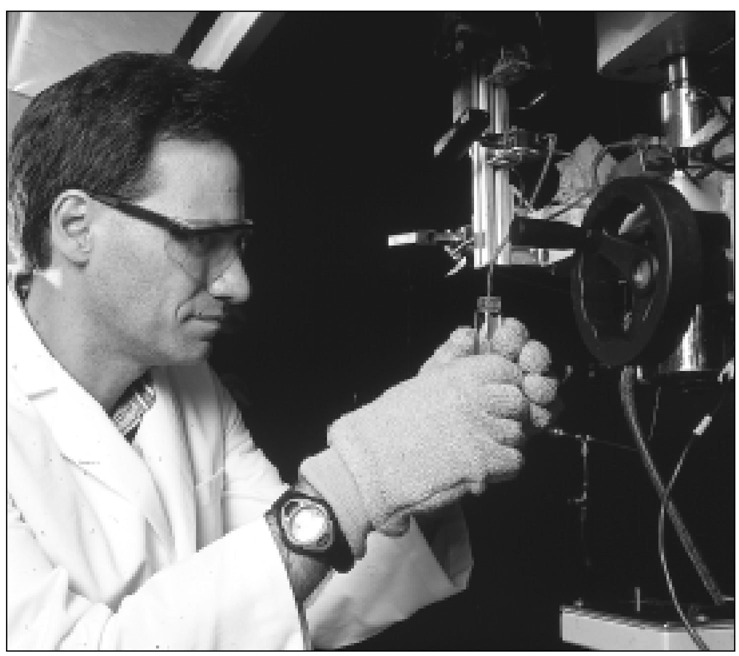
Project Title	Principal Investigators
Designed catalyst sytems for the efficient conversion of soybean oil to value-added oxidation products	Brent Shanks, Victor Lin and George Kraus
Improved catalytic process for the epoxidation of vegetable oils	Robert Angelici, James Espenson, George Kraus and Earl Hammond
Processing transgenic maize to recover valuable therapeutic proteins and industrial enzymes*	Charles Glatz, Larry Johnson and Paul Scott
Olefins and new bioplastics from cometathesis of soy/corn oils	Richard Larock and Glenn Schrader
Development of novel vegetable-oil based biolubricants*	Basil Nikolau, Eve Wurtele and Earl Hammond
Fiber to biobased products via syn gas fermentation	Theodore Heindel, Alan DeSpirito, Robert Brown and Basil Nikolau
Thermosetting wood adhesive resins from biorenewable materials	Monlin Kuo, Robert Brown and Deland Myers
Value-added products from wood fiber	John Verkade and Daniel Armstrong
Utilization of soybean material and natural fillers to produce composites/nanocomposites and diversity applications of biobased products	Perminus Mungara, Jay-lin-Jane, Douglas Stokke and Tao Chang
Formulating environmentally friendly wood preservatives with soy and feather proteins	Deland Myers, Monlin Kuo and Victor Lin
Monolayer oxidation of lipids on particulate supports	Lawrence Johnson, Keith Woo and Earl Hammond
* unsigned	



Brent Shanks draws a sample of the conversion product from a batch reactor. This sample will be analyzed for yield of the desired dibasic acid product.

A banner year for CRADAs

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Keith Stanger, a graduate student working with senior chemist Robert Angelici, tests the activity of a new catalyst for the epoxidation of soybean oil.

Accomplishing this goal would help improve U.S. competitiveness internationally, provide greater crop diversity for farmers, reduce carbon dioxide emissions from the use of conventional fossil fuels, help form new industries, and enhance economic development in rural states like Iowa.

After funding was announced in January, a request for proposals from Ames Lab and ISU scientists was issued. Nineteen proposals were received. Of those, 11 were chosen to each receive an average direct cost of $80,000 in one-year funding. All but two of the 11 CRADA proposals have been signed.

A goal of the BRC is to fund broad-based proposals. These particular CRADA projects include activities such as converting fiber to biobased products, developing value-added products from wood fiber, and utilizing soybean material and natural fillers to produce biobased composites and nanocomposites. One project even looks at using feather and soy proteins to formulate environmentally friendly wood preservatives. "A lot of interesting science is emerging," says George Kraus, chair of the BRC task force and an ISU chemistry professor. "I can't wait to see how the various projects pan out."

One of the projects being funded deals with converting soy oil to value-added oxidation products. Associate professor of chemical engineering Brent Shanks says the work involves taking a biorenewable resource, such as soybean oil, and producing dibasic acids by cleaving, or splitting, the fatty acids contained within. These dibasic acids could be used to replace adipic acid, which is a basic ingredient used in the production of nylon. Nylon is used extensively in carpeting and other products. Industry produces over a billion pounds of adipic acid each year, all of which is produced from fossil fuels. Shanks and his colleagues want to determine if the adipic acid replacement can be produced from biological sources rather than fossil fuels. "There's a great opportunity before us to get rid of this fossil-fuel-derived material in favor of one that's soybean-oil-derived," says Shanks, who adds that dibasic acids produced from biorenewable materials also have the potential to be cheaper to manufacture than adipic acid made from fossil fuels, which "would provide better economics for industry."

Another goal of the BRC is to fund proposals that are collaborative in nature, meaning they include interactions between scientists from various disciplines. In all, 25 scientists will be collaborating on the 11 different proposals. For example, the dibasic acid research in which Shanks, a chemical engineer, is involved also includes two chemists, Victor Lin, assistant professor of chemistry, and Kraus. "We want to bring people together who really haven't interacted with one another much," says Kraus. "Whenever this happens, you almost always get different perspectives and, hence, new ideas and strategies for solving problems." Another benefit to the CRADAs, according to Covey, is they include many ISU scientists who haven't been involved with the Ames Laboratory. "Now they have a good understanding of the Lab and its mission," says Covey, who adds that this should make things easier in the future should these scientists be involved in future CRADAs with the Lab.

As for the future of the CRADA program at the Ames Laboratory, it really depends on further funding and appropriate projects, of course. Although the DOE Office of Science Laboratory Technology Research Program has zeroed out funding for CRADAs, the DOE itself continues to fund them. There is an option to do 100 percent funds-in CRADAs, which is where the partner provides all funding for the work. The Lab has a couple of these in various stages of negotiation. "Whether we do 1-3 CRADAs per year or 11," says Covey, "the Office of Industrial Outreach is ready to work with our scientists and partners to move cutting-edge research from the scientists' workbench to the market shelf." ■

~ Steve Karsjen